DEPARTMENT OF ENERGY

[Case Number 2020-009; EERE-2020-BT-WAV-0025]

Energy Conservation Program: Notice of Petition for Waiver of Heat Transfer Products Group from the Department of Energy Walk-in Coolers and Walk-in Freezers Test Procedure and Notice of Grant of Interim Waiver

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notification of petition for waiver and grant of an interim waiver; request for comments.

SUMMARY: This document announces receipt of and publishes a petition for waiver and interim waiver from Heat Transfer Products Group ("HTPG"), which seeks a waiver for specified carbon dioxide ("CO2") direct expansion unit cooler basic models from the U.S. Department of Energy ("DOE") test procedure used to determine the efficiency of walk-in cooler and walk-in freezer refrigeration systems. DOE also gives notice of an Interim Waiver Order that requires HTPG to test and rate the specified CO2 direct expansion unit cooler basic models in accordance with the alternate test procedure set forth in the Interim Waiver Order. DOE solicits comments, data, and information concerning HTPG's petition and its suggested alternate test procedure so as to inform DOE's final decision on HTPG's waiver request.

DATES: The Interim Waiver Order is effective on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Written comments and information will be accepted on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *http://www.regulations.gov*. Alternatively, interested persons may submit comments, identified by case number "2020-009", and Docket number "EERE-2020-BT-WAV-0025," by any of the following methods:

- *Federal eRulemaking Portal*: *http://www.regulations.gov*. Follow the instructions for submitting comments.
- *E-mail*: *HTPG2020WAV0025@ee.doe.gov.* Include Case No. 2020-009 in the subject line of the message.
- *Postal Mail*: Appliance and Equipment Standards Program, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, Mail Stop EE-5B, Petition for Waiver Case No. 2020-009, 1000 Independence Avenue, SW., Washington, DC 20585-0121. If possible, please submit all items on a compact disc ("CD"), in which case it is not necessary to include printed copies.
- *Hand Delivery/Courier*: Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L'Enfant Plaza, SW., 6th floor, Washington, DC, 20024. Telephone: (202) 287-1445. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

No telefacsimilies ("faxes") will be accepted. For detailed instructions on submitting comments and additional information on this process, see the "**SUPPLEMENTARY INFORMATION**" section of this document.

Docket: The docket, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at *http://www.regulations.gov*. All documents in the docket are listed in the *http://www.regulations.gov* index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

The docket web page can be found at *http://www.regulations.gov/docket?D=EERE-2020-BT-WAV-0025*. The docket web page contains instruction on how to access all documents, including public comments, in the docket. See the "**SUPPLEMENTARY INFORMATION**" section for information on how to submit comments through *http://www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT: Ms. Lucy deButts, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, Mail Stop EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. E-mail: *AS_Waiver_Request@ee.doe.gov*.

Michael Kido, U.S. Department of Energy, Office of the General Counsel, Mail Stop GC-33, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585-0103. Telephone: (202) 586-8145. E-mail: *Michael.Kido@hq.doe.gov*.

SUPPLEMENTARY INFORMATION: DOE is publishing HTPG's petition for waiver in its entirety, pursuant to 10 CFR 431.401(b)(1)(iv)[1]. DOE invites all interested parties to submit in writing by [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***], comments and information on all aspects of the petition, including the alternate test procedure. Pursuant to 10 CFR 431.401(d), any person submitting written comments to DOE must also send a copy of such comments to the petitioner. The contact information for the petitioner is Michael Straub, *mike.straub@htpg.com*, 201 Thomas French Dr., Scottsboro, AL 35769-7405.

Submitting comments via http://www.regulations.gov. The *http://www.regulations.gov* web page will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

[1] The petition did not identify any of the information contained therein as confidential business information.

However, your contact information will be publicly viewable if you include it in the comment or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. If this instruction is followed, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to *http://www.regulations.gov* information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information ("CBI")). Comments submitted through *http://www.regulations.gov* cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through *http://www.regulations.gov* before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that *http://www.regulations.gov* provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery/courier, or postal mail. Comments and documents submitted via email, hand delivery/courier, or postal mail also will be posted to *http://www.regulations.gov*. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information on a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via postal mail or hand delivery/courier, please provide all

items on a CD, if feasible, in which case it is not necessary to submit printed copies. Faxes will not be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are not secured, written in English and free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. According to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery/courier two well-marked copies: one copy of the document marked confidential including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

Signing Authority

This document of the Department of Energy was signed on November 24, 2020, by Alexander N. Fitzsimmons, Deputy Assistant Secretary for Energy Efficiency, Energy Efficiency

and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on November 24, 2020

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Treena V. Garrett
Federal Register Liaison Officer,
U.S. Department of Energy

Case Number 2020-009

Interim Waiver Order

I. Background and Authority

The Energy Policy and Conservation Act, as amended ("EPCA"),[1] authorizes the U.S. Department of Energy ("DOE") to regulate the energy efficiency of a number of consumer products and certain industrial equipment (42 U.S.C. 6291–6317). Title III, Part C[2] of EPCA (42 U.S.C. 6311-6316, as codified), added by the National Energy Conservation Policy Act, Public Law 95-619, sec. 441 (Nov. 9, 1978), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve the energy efficiency for certain types of industrial equipment. Through amendments brought about by the Energy Independence and Security Act of 2007, Pub. L. 110-140, sec. 312 (Dec. 19, 2007), this equipment includes walk-in cooler and walk-in freezer (collectively, "walk-in") refrigeration systems**,** the focus of this document (42 U.S.C. 6311(1)(G)).

The energy conservation program under EPCA consists essentially of four parts: (1) testing, (2) labeling, (3) Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

The Federal testing requirements consist of test procedures that manufacturers of covered equipment must use as the basis for: (1) certifying to DOE that their equipment complies with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(a); 42 U.S.C. 6295(s)), and (2) making representations about the efficiency of that equipment (42

[1] All references to EPCA in this document refer to the statute as amended through America's Water Infrastructure Act of 2018, Public Law 115-270 (Oct. 23, 2018).
[2] For editorial reasons, upon codification in the U.S. Code, Part C was redesignated as Part A-1.

U.S.C. 6314(d)). Similarly, DOE must use these test procedures to determine whether the covered equipment complies with relevant standards promulgated under EPCA. (42 U.S.C. 6316(a); 42 U.S.C. 6295(s))

Under 42 U.S.C. 6314, EPCA sets forth the criteria and procedures DOE is required to follow when prescribing or amending test procedures for covered equipment. EPCA requires that any test procedures prescribed or amended under this section must be reasonably designed to produce test results which reflect the energy efficiency, energy use or estimated annual operating cost of covered equipment during a representative average use cycle and requires that test procedures not be unduly burdensome to conduct (42 U.S.C. 6314(a)(2)). The test procedure for walk-in refrigeration systems is contained in the Code of Federal Regulations ("CFR") at 10 CFR part 431, subpart R, appendix C, *Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-In Cooler and Walk-In Freezer Refrigeration Systems* ("Appendix C").

Under 10 CFR 431.401, any interested person may submit a petition for waiver from DOE's test procedure requirements. DOE will grant a waiver from the test procedure requirements if DOE determines either that the basic model for which the waiver was requested contains a design characteristic that prevents testing of the basic model according to the prescribed test procedures, or that the prescribed test procedures evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as to provide materially inaccurate comparative data. 10 CFR 431.401(f)(2). A petitioner must include in its petition any alternate test procedures known to the petitioner to evaluate the performance of the equipment type in a manner representative of the energy consumption characteristics of the basic model. 10 CFR 431.401(b)(1)(iii). DOE may grant the waiver subject to conditions, including adherence to alternate test procedures specified by DOE. 10 CFR 431.401(f)(2).

As soon as practicable after the granting of any waiver, DOE will publish in the *Federal Register* a notice of proposed rulemaking to amend its regulations so as to eliminate any need for

the continuation of such waiver. 10 CFR 431.401(l). As soon thereafter as practicable, DOE will publish in the *Federal Register* a final rule to that effect. *Id*.

The waiver process also provides that DOE may grant an interim waiver if it appears likely that the underlying petition for waiver will be granted and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination on the underlying petition for waiver. 10 CFR 431.401(e)(2). Within one year of issuance of an interim waiver, DOE will either: (i) publish in the *Federal Register* a determination on the petition for waiver; or (ii) publish in the *Federal Register* a new or amended test procedure that addresses the issues presented in the waiver. 10 CFR 431.401(h)(1).

When DOE amends the test procedure to address the issues presented in a waiver, the waiver will automatically terminate on the date on which use of that test procedure is required to demonstrate compliance. 10 CFR 431.401(h)(2).

II. HTPG's Petition for Waiver and Interim Waiver

On July 6, 2020, HTPG filed a petition for waiver and interim waiver from the test procedure for walk-in refrigeration systems set forth at 10 CFR part 431, subpart R, appendix C (HTPG, No. 1 at p. 1[3]). HTPG claims that the test conditions described in Table 15 and Table 16 of the Air-Conditioning, Heating, and Refrigeration Institute ("AHRI") Standard 1250-2009, *Standard for Performance Rating of Walk-In Coolers and Freezers* ("AHRI 1250-2009") (for walk-in refrigerator unit coolers and freezer unit coolers tested alone, respectively), as incorporated by Appendix C with modification, cannot be achieved by the specified basic models and are not consistent with operation of HTPG's CO2 direct expansion unit coolers . HTPG stated that CO2 has a critical temperature of 87.8 ˚F[4], and thus the required liquid inlet saturation

[3] A notation in the form "HTPG, No.1" identifies a written submission: (1) made by HTPG; and (2) recorded in document number 1 that is filed in the docket of this petition for waiver (Docket No. EERE-2020-BT-WAV-0025) and available at *http://www.regulations.gov/docket?D=EERE-2020-BT-WAV-0025*.

[4] The test procedure specifies the unit cooler refrigerant inlet condition in terms of a saturation temperature (the temperature at which it completes the condensation process in a condenser) and the subcooling temperature (additional reduction in temperature lower than the specified saturation temperature). For CO2, the critical temperature above which there cannot exist separate liquid and gas phases is below the saturation condition specified in the test procedure, hence the specified condition cannot be achieved.

temperature of 105 ˚F and the required liquid inlet subcooling temperature of 9 ˚F are not achievable, and that the test conditions should be more consistent with typical operating conditions for a transcritical CO2 booster system (HTPG, No. 1).

The statements made by HTPG reference the difference in thermodynamic properties between CO2 and other refrigerants. At modest pressures (i.e. below the critical point), many substances transition from a solid to a liquid to a gas as temperature increases. For example, a pure substance like water transitions from liquid to steam at a specific temperature, e.g. 212 ˚F, at atmospheric pressure. As heat is added during a liquid to gas transition, the temperature remains constant and the substance coexists as both liquid and vapor. Continuing to add heat converts more of the liquid to vapor at a constant temperature. The reverse occurs when heat is removed. However, the transition temperature depends on the pressure – the higher the pressure, the higher the transition temperature. This is a key principle in refrigeration systems, which operate at two pressure levels associated with two temperatures. A refrigerant absorbs heat when it is at a low temperature and pressure, converting to gas and cooling the surrounding space. At high temperature and pressure, the refrigerant transitions to a liquid while releasing heat to the environment. A compressor is used to raise the low-pressure gas to a high pressure, and a throttle (pressure reduction device) is used to reduce the pressure once the refrigerant has been fully liquefied (condensed) at high pressure.

All refrigerants have a “critical pressure” and an associated “critical temperature” above which liquid and vapor phases cannot coexist. Above this critical point, the refrigerant will be a gas and its temperature will increase or decrease as heat is added or removed. For all conventional refrigerants, the critical pressure is so high that it is never exceeded in typical refrigeration cycles. For example, R404A is a common refrigerant used in refrigeration systems that has a critical pressure of 540.8 psia[5] with an associated critical temperature of 161.7 ˚F.

[5] Absolute pressure is the pressure measured relative to a complete vacuum; “psia” represents the absolute pressure in pounds per square inch.

However, CO2 behaves differently, with a critical pressure of 1,072 psia associated with a much lower critical temperature of 87.8 ˚F. The refrigerant temperature must be somewhat higher than the ambient temperature in order to reject refrigeration cycle heat to the ambient environment. Ambient temperatures greater than 87.8 °F are common and the performance of many refrigeration and air conditioning systems are tested using a 95 ˚F ambient temperature, as indicated by the A test condition in AHRI 1250-2009 Section 5. At temperatures greater than the critical temperature, the CO2 refrigerant is in a supercritical state (i.e. a condition with pressure above the critical temperature) and heat is transferred to the environment. Since useful cooling is provided below the critical temperature, CO2 cycles are said to be transcritical.

The transcritical nature of CO2 generally requires more complex refrigeration cycle design to approach the efficiency of traditional refrigerants (i.e., R404A, R407A, R448A, etc.) during operation in high temperature conditions. To increase efficiency and prevent overheating, transcritical booster systems introduce (or use) multiple stages of compression and intercooling. CO2 is cooled in the gas cooler of a transcritical booster system, then expands through a high-pressure control valve and is delivered to a subcritical-pressure flash tank. In the flash tank, the refrigerant is in the subcritical phase and the liquid and vapor phases can be separated. A unit cooler in a CO2 booster system would be supplied with liquid refrigerant from the flash tank via expansion valves where the refrigerant is evaporated. The evaporated refrigerant is subsequently compressed up to gas cooler pressure to complete the cycle (HTPG, No. 2).

HTPG also requests an interim waiver from the existing DOE test procedure. DOE will grant an interim waiver if it appears likely that the petition for waiver will be granted, and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination of the petition for waiver. *See* 10 CFR 431.401(e)(2).

Based on the assertions in the petition, absent an interim waiver, the prescribed test procedure is not appropriate for HTPG's CO2 direct expansion unit coolers and the test conditions are not achievable, since CO2 refrigerant has a critical temperature of 87.8 °F and the

current DOE test procedure calls for a liquid inlet saturation temperature of 105°F. The inability to achieve test conditions for the stated basic models would result in economic hardship from loss of sales stemming from the inability of the DOE test procedure to address the operating conditions of HTPG's equipment.

III. Requested Alternate Test Procedure

EPCA requires that manufacturers use the applicable DOE test procedures when making representations about the energy consumption and energy consumption costs of covered equipment (42 U.S.C. 6314(d)). Consistency is important when making representations about the energy efficiency of equipment, including when demonstrating compliance with applicable DOE energy conservation standards. Pursuant to 10 CFR 431.401, and after consideration of public comments on the petition, DOE may establish in a subsequent Decision and Order an alternate test procedure for the basic models addressed by the Interim Waiver Order.

HTPG seeks to test and rate specific CO2 direct expansion unit cooler basic models with modifications to the DOE test procedure. HTPG's suggested approach specifies using modified liquid inlet saturation and liquid inlet subcooling temperatures – 38˚F and 5˚F, respectively, for both walk-in refrigerator unit coolers and walk-in freezer unit coolers. Additionally, HTPG recommends that because the subject units are used in transcritical CO2 booster systems the calculations in AHRI 1250-2009 section 7.9 should be used to determine AWEF and net capacity for unit coolers matched to parallel rack systems as required under the DOE test procedure. This section of AHRI 1250-2009 is prescribed by the DOE test procedure for determining AWEF for all unit coolers tested alone (see 10 CFR part 431, subpart R, appendix C, section 3.3.1). Finally, HTPG also recommends that AHRI 1250-2009 Table 17, EER for Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets, should be used to determine power consumption of CO2 direct expansion unit cooler systems as required under the DOE test procedure.

IV. Interim Waiver Order

DOE has reviewed HTPG's application, its suggested testing approach, industry materials regarding CO2 transcritical booster systems, and HTPG's consumer-facing materials, including websites and product specification sheets for the basic models listed in HTPG's petition. Based on this review, the suggested testing approach appears to allow for the accurate measurement of energy efficiency of the specified basic models, while alleviating the testing issues associated with HTPG's implementation of walk-in cooler and walk-in freezer testing for these basic models. Review of the CO2 refrigeration market confirms that the test conditions of the testing approach suggested by HTPG would be representative for operation of a unit cooler used in a transcritical CO2 booster system (HTPG, No. 4). CO2 that is cooled in the gas cooler of a transcritical booster system expands through a high-pressure control valve that delivers CO2 to a subcritical-pressure flash tank, where liquid and vapor phases of the refrigerant are separated. The liquid is then split and the unit coolers receive the refrigerant at the same condition, consistent with the use of the same liquid inlet saturation temperature for both the medium- and low-temperature systems in HTPG's suggested test approach. Calculations on other external CO2 refrigeration system designs in the market indicate that the 38 °F liquid unit cooler inlet saturation temperature suggested by HTPG is representative of CO2 booster systems (HTPG, No. 2). Regarding use of the EER values in AHRI 1250-2009 Table 17 to determine the representative compressor power consumption for CO2 unit cooler systems, research into the performance of different configurations of CO2 booster systems shows that enhanced CO2 cycles (like those used in transcritical booster systems) can match conventional refrigerants in average annual efficiency (HTPG, No. 3). These data and studies help to justify the use of the EER values in AHRI 1250-2009 Table 17 for determining the power consumption of CO2 booster system evaporators, even though these EER values were initially established for conventional refrigerants. Consequently, DOE has determined that HTPG's petition for waiver likely will be granted. Furthermore, DOE has determined that it is desirable for public policy reasons to grant HTPG immediate relief pending a determination of the petition for waiver.

For the reasons stated, it is **ORDERED** that:

(1) HTPG must test and rate the following CO2 direct expansion unit cooler basic models with the alternate test procedure set forth in paragraph (2).

Russell branded Basic Model Numbers:

RL6A041ADAF	RL6A041DDAF	RL6A052ADAF	RL6A052DDAF	RL6A066ADAF	RL6A066DDAF
RL6A073ADAF	RL6A073DDAF	RL6A094ADAF	RL6A094DDAF	RL6A117ADAF	PL6A117DDAF
RL6A130ADAF	RL6A130DDAF	RL6A141ADAF	RL6A141DDAF	RL6A161ADAF	RL6A161DDAF
RL6A181ADAF	RL6A181DDAF	RL6A195ADAF	RL6A195DDAF	RL6A235ADAF	RL6A235DDAF
RL6A260ADAF	RL6A260DDAF	RL6A295ADAF	RL6A295DDAF	RL6A330ADAF	RL6A330DDAF
RL6A390ADAF	RL6A390DDAF	RL6E035DDAF	RL6E042DDAF	RL6E049DDAF	RL6E066DDAF
RL6E077DDAF	RL6E090DDAF	RL6E105DDAF	RL6E121DDAF	RL6E142DDAF	RL6E162DDAF
RL6E182DDAF	RL6E200DDAF	RL6E200EDAF	RL6E244DDAF	RL6E244EDAF	RL6E281DDAF
RL6E281EDAF	RL4E027DDAF	RL4E032DDAF	RL4E038DDAF	RL4E051DDAF	RL4E064DDAF
RL4E080DDAF	RL4E094DDAF	RL4E110DDAF	RL4E125DDAF	RL4E141DDAF	RL4E155DDAF
RL4E155EDAF	RL4E195DDAF	RL4E195EDAF	RL4E230DDAF	RL4E230EDAF	

RM6A182ADAF	RM6A182DDAF	RM6A182FDAF	RM6A220ADAF	RM6A220DDAF	RM6A220FDAF
RM6A276ADAF	RM6A276DDAF	RM6A276FDAF	RM6A370ADAF	RM6A370DDAF	RM6A370FDAF
RM6A442ADAF	RM6A442DDAF	RM6A442FDAF	RM6A549ADAF	RM6A549DDAF	RM6A549FDAF
RM6A658ADAF	RM6A658DDAF	RM6A658FDAF	RM6E153DDAF	RM6E153EDAF	RM6E153FDAF
RM6E153GDAF	RM6E184DDAF	RM6E184EDAF	RM6E184FDAF	RM6E184GDAF	RM6E311DDAF
RM6E311EDAF	RM6E311FDAF	RM6E311GDAF	RM6E374DDAF	RM6E374EDAF	RM6E374FDAF
RM6E374GDAF	RM6E469EDAF	RM6E469FDAF	RM6E469GDAF	RM6E564EDAF	RM6E564FDAF
RM6E564GDAF	RM4E110DDAF	RM4E110EDAF	RM4E110FDAF	RM4E110GDAF	RM4E143DDAF
RM4E143EDAF	RM4E143FDAF	RM4E143GDAF	RM4E232DDAF	RM4E232EDAF	RM4E232FDAF
RM4E232GDAF	RM4E288DDAF	RM4E288EDAF	RM4E288FDAF	RM4E288GDAF	RM4E336EDAF
RM4E336FDAF	RM4E336GDAF	RM4E419EDAF	RM4E419FDAF	RM4E419GDAF	

RV6A043ADAF	RV6A043DDAF	RV6A053ADAF	RV6A053DDAF	RV6A085ADAF	RV6A085DDAF
RV6A106ADAF	RV6A106DDAF	RV6A129ADAF	RV6A129DDAF	RV6A158ADAF	RV6A158DDAF
RV6A176ADAF	RV6A176DDAF	RV6A218ADAF	RV6A218DDAF	RV6A271ADAF	RV6A271DDAF
RV6E043DDAF	RV6E053DDAF	RV6E085DDAF	RV6E106DDAF	RV6E129DDAF	RV6E158DDAF
RV6E176DDAF	RV6E218DDAF	RV6E271DDAF			

ASLA25048ADAF	ASLA25048DDAF	ASLA25061ADAF	ASLA25061DDAF	ASLA35073ADAF	ASLA35073DDAF
ASLA45098ADAF	ASLA45098DDAF	ASLA55122ADAF	ASLA55122DDAF	ASLA65158ADAF	ASLA65158DDAF
ASLE25048DDAF	ASLE25058DDAF	ASLE35070DDAF	ASLE45094DDAF	ASLE55117DDAF	ASLE65150DDAF

RE6A041ADAF	RE6A041DDAF	RE6A070ADAF	RE6A070DDAF	RE6A084ADAF	RE6A084DDAF
RE6A104ADAF	RE6A104DDAF	RE6A128ADAF	RE6A128DDAF	RE6A141ADAF	RE6A141DDAF
RE6A169ADAF	RE6A169DDAF	RE6A204ADAF	RE6A204DDAF	RE6A258ADAF	RE6A258DDAF
RE6E037DDAF	RE6E045DDAF	RE6E075DDAF	RE6E089DDAF	RE6E108DDAF	RE6E125DDAF
RE6E137DDAF	RE6E182DDAF	RE6E221DDAF	RE6E278DDAF	RE4E037DDAF	RE4E075DDAF
RE4E107DDAF	RE4E149DDAF	RE4E186DDAF	RE4E234DDAF		

RH6A031DDAF	RH6A031FDAF	RH6A043DDAF	RH6A043FDAF	RH6A052DDAF	RH6A052FDAF
RH6A063DDAF	RH6A063FDAF	RH6A087DDAF	RH6A087FDAF	RH6A105DDAF	RH6A105FDAF
RH6A132DDAF	RH6A132FDAF	RH6A156DDAF	RH6A156FDAF	RH6A175DDAF	RH6A175FDAF
RH6A209DDAF	RH6A209FDAF	RH6E033DDAF	RH6E033EDAF	RH6E033FDAF	RH6E033GDAF
RH6E044DDAF	RH6E044EDAF	RN6E044FDAF	RH6E044GDAF	RH6E053DDAF	RH6E053EDAF
RH6E053FDAF	RH6E053GDAF	RH6E066DDAF	RH6E066EDAF	RH6E066FDAF	RH6E066GDAF
RH6E089DDAF	RH6E089EDAF	RH6E089FDAF	RH6E089GDAF	RH6E109DDAF	RH6E109EDAF
RH6E109FDAF	RH6E109GDAF	RH6E134DDAF	RH6E134EDAF	RH6E134FDAF	RH6E134GDAF
RH6E163DDAF	RH6E163EDAF	RH6E163FDAF	RH6E163GDAF	RH6E199DDAF	RH6E199EDAF
RH6E199FDAF	RH6E199GDAF	RH4E035DDAF	RH4E035EDAF	RH4E035FDAF	RH4E035GDAF
RH4E044DDAF	RH4E044EDAF	RH4E044FDAF	RH4E044GDAF	RH4E071DDAF	RH4E071EDAF
RH4E071FDAF	RH4E071GDAF	RH4E087DDAF	RH4E087EDAF	RH4E087FDAF	RH4E087GDAF
RH4E107DDAF	RH4E107EDAF	RH4E107FDAF	RH4E107GDAF	RH4E131DDAF	RH4E131EDAF
RH4E131FDAF	RH4E131GDAF	RH4E167DDAF	RH4E167EDAF	RH4E167FDAF	RH4E167GDAF

(2) The HTPG basic models identified in paragraph (1) of this Interim Waiver Order shall be tested according to the test procedure for walk-in cooler and walk-in freezer refrigeration systems prescribed by DOE at 10 CFR part 431, subpart R, appendix C ("Appendix C"), except that the liquid inlet saturation temperature test condition and liquid inlet subcooling temperature test condition shall be modified to 38˚F and 5˚F, respectively, for both walk-in refrigerator unit coolers and walk-in freezer unit coolers, as detailed below. All other requirements of Appendix C and DOE's regulations remain applicable.

In Appendix C, under section 3.1**.** *General modifications: Test Conditions and Tolerances,* revise section 3.1.5., to read as follows:

3.1.5. Tables 15 and 16 shall be modified to read as follows:

TABLE 15—REFRIGERATOR UNIT COOLER

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	35	<50	—	—	—	Compressor Off	Measure fan input power during

							compressor off cycle.
Refrigeration Capacity Suction A	35	<50	25	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.

Note: Superheat to be set according to equipment specification in equipment or installation manual. If no superheat specification is given, a default superheat value of 6.5 °F shall be used. The superheat setting used in the test shall be reported as part of the standard rating.

TABLE 16—FREEZER UNIT COOLER

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	−10	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	−10	<50	−20	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Defrost	−10	Various	—	—	—	Compressor Off	Test according to Appendix C Section C11.

Note: Superheat to be set according to equipment specification in equipment or installation manual. If no superheat specification is given, a default superheat value of 6.5 °F shall be used. The superheat setting used in the test shall be reported as part of the standard rating.

(3) *Representations*. HTPG may not make representations about the energy efficiency of a basic model listed in paragraph (1) of this Interim Waiver Order for compliance, marketing, or other purposes unless the basic model has been tested in accordance with the provisions set forth in this alternate test procedure and such representations fairly disclose the results of such testing.

(4) This Interim Waiver Order shall remain in effect according to the provisions of 10 CFR 431.401.

(5) This Interim Waiver Order is issued on the condition that the statements and representations provided by HTPG are valid. If HTPG makes any modifications to the controls or configurations of a basic model subject to this Interim Waiver Order, such modifications will render the waiver invalid with respect to that basic model, and HTPG will either be required to use the current Federal test method or submit a new application for a test procedure waiver. DOE may rescind or modify this waiver at any time if it determines the factual basis underlying the petition for the Interim Waiver Order is incorrect, or the results from the alternate test procedure are unrepresentative of the basic model's true energy consumption characteristics. 10 CFR 431.401(k)(1). Likewise, HTPG may request that DOE rescind or modify the Interim Waiver Order if HTPG discovers an error in the information provided to DOE as part of its petition, determines that the interim waiver is no longer needed, or for other appropriate reasons. 10 CFR 431.401(k)(2).

(6) Issuance of this Interim Waiver Order does not release HTPG from the applicable requirements set forth at 10 CFR part 429.

DOE makes decisions on waivers and interim waivers for only those basic models specifically set out in the petition, not future models that may be manufactured by the petitioner. HTPG may submit a new or amended petition for waiver and request for grant of interim waiver, as appropriate, for additional basic models of CO2 direct expansion unit coolers. Alternatively, if appropriate, HTPG may request that DOE extend the scope of a waiver or an interim waiver to include additional basic models employing the same technology as the basic model(s) set forth in the original petition consistent with 10 CFR 431.401(g).

Signed in Washington, DC, on November 24, 2020

_____

Alexander N. Fitzsimmons
Deputy Assistant Secretary
for Energy Efficiency
Energy Efficiency and Renewable Energy

HTPG

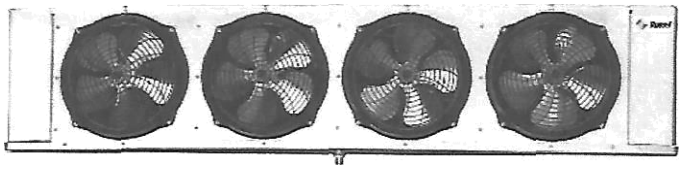
Heat Transfer Products Group
a division of RHEEM Manufacturing

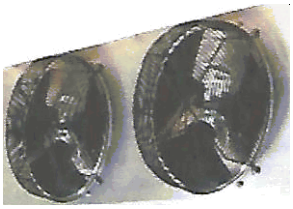
July 6, 2020

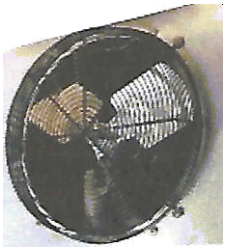
Petition for a Waiver and Interim Waiver

Request for Waiver and Interim Waiver from a DOE test procedure pursuant to provisions described in 10 CFR 431.401 for the following products on the grounds that "the basic model contains one or more design characteristics that prevent testing of the basic model according to the prescribed test procedures."

CO2 Direct Expansion Unit Coolers in Medium and Low Temperature







KRAMER ColdZone Russell Witt

205 Thomas French Dr. Scottsboro AL 35769-7405 Ph. 256-259-7400 Fax: 256-259-7474

The design characteristics constituting the grounds for the Waiver and Interim Waiver Application:

- Appendix C to Subpart R of Part 431 — Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-in Cooler and Walk-in Freezer Refrigeration Systems specifies that unit coolers tested alone use the test procedures described in AHRI 1250-2009. Table 15 and Table 16 of AHRI 1250-2009 are as follows:

Table 15—Refrigerator Unit Cooler

Test description	Unit cooler air entering dry-bulb °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	35	<50	--	--	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	35	<50	25	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Refrigeration Capacity Suction B	35	<50	20	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.

Table 16—Freezer Unit Cooler

Test description	Unit cooler air entering dry-bulb °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	-10	<50	--	--	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	-10	<50	-20	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Refrigeration Capacity Suction B	-10	<50	-26	105	9	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Defrost	-10	Various	--	--	--	Compressor Off	Test according to Appendix C Section C11.

- CO2 refrigerant has a critical temperature of 87.8°F thus the liquid inlet saturation temperature of 105°F and the liquid inlet subcooling temperature of 9°F as specified in Table 15 and Table 16 are not achievable.
- The test condition values need to be more in line with typical operating conditions for a transcritical CO2 booster system.

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Basic Models on which the Waiver and Interim Waiver is being requested (All Russell Brand):

RL6A041ADAF	RL6A041DDAF	RL6A052ADAF	RL6A052DDAF	RL6A066ADAF	RL6A066DDAF
RL6A073ADAF	RL6A073DDAF	RL6A094ADAF	RL6A094DDAF	RL6A117ADAF	PL6A117DDAF
RL6A130ADAF	RL6A130DDAF	RL6A141ADAF	RL6A141DDAF	RL6A161ADAF	RL6A161DDAF
RL6A181ADAF	RL6A181DDAF	RL6A195ADAF	RL6A195DDAF	RL6A235ADAF	RL6A235DDAF
RL6A260ADAF	RL6A260DDAF	RL6A295ADAF	RL6A295DDAF	RL6A330ADAF	RL6A330DDAF
RL6A390ADAF	RL6A390DDAF	RL6E035DDAF	RL6E042DDAF	RL6E049DDAF	RL6E066DDAF
RL6E077DDAF	RL6E090DDAF	RL6E105DDAF	RL6E121DDAF	RL6E142DDAF	RL6E162DDAF

RL6E182DDAF RL6E200DDAF RL6E200EDAF RL6E244DDAF RL6E244EDAF RL6E281DDAF
RL6E281EDAF RL4E027DDAF RL4E032DDAF RL4E038DDAF RL4E051DDAF RL4E064DDAF
RL4E080DDAF RL4E094DDAF RL4E110DDAF RL4E125DDAF RL4E141DDAF RL4E155DDAF
RL4E155EDAF RL4E195DDAF RL4E195EDAF RL4E230DDAF RL4E230EDAF

RM6A182ADAF RM6A182DDAF RM6A182FDAF RM6A220ADAF RM6A220DDAF RM6A220FDAF
RM6A276ADAF RM6A276DDAF RM6A276FDAF RM6A370ADAF RM6A370DDAF RM6A370FDAF
RM6A442ADAF RM6A442DDAF RM6A442FDAF RM6A549ADAF RM6A549DDAF RM6A549FDAF
RM6A658ADAF RM6A658DDAF RM6A658FDAF RM6E153DDAF RM6E153EDAF RM6E153FDAF
RM6E153GDAF RM6E184DDAF RM6E184EDAF RM6E184FDAF RM6E184GDAF RM6E311DDAF
RM6E311EDAF RM6E311FDAF RM6E311GDAF RM6E374DDAF RM6E374EDAF RM6E374FDAF
RM6E374GDAF RM6E469EDAF RM6E469FDAF RM6E469GDAF RM6E564EDAF RM6E564FDAF
RM6E564GDAF RM4E110DDAF RM4E110EDAF RM4E110FDAF RM4E110GDAF RM4E143DDAF
RM4E143EDAF RM4E143FDAF RM4E143GDAF RM4E232DDAF RM4E232EDAF RM4E232FDAF
RM4E232GDAF RM4E288DDAF RM4E288EDAF RM4E288FDAF RM4E288GDAF RM4E336EDAF
RM4E336FDAF RM4E336GDAF RM4E419EDAF RM4E419FDAF RM4E419GDAF

RV6A043ADAF RV6A043DDAF RV6A053ADAF RV6A053DDAF RV6A085ADAF RV6A085DDAF
RV6A106ADAF RV6A106DDAF RV6A129ADAF RV6A129DDAF RV6A158ADAF RV6A158DDAF
RV6A176ADAF RV6A176DDAF RV6A218ADAF RV6A218DDAF RV6A271ADAF RV6A271DDAF
RV6E043DDAF RV6E053DDAF RV6E085DDAF RV6E106DDAF RV6E129DDAF RV6E158DDAF
RV6E176DDAF RV6E218DDAF RV6E271DDAF

ASLA25048ADAF ASLA25048DDAF ASLA25061ADAF ASLA25061DDAF ASLA35073ADAF ASLA35073DDAF
ASLA45098ADAF ASLA45098DDAF ASLA55122ADAF ASLA55122DDAF ASLA65158ADAF ASLA65158DDAF
ASLE25048DDAF ASLE25058DDAF ASLE35070DDAF ASLE45094DDAF ASLE55117DDAF ASLE65150DDAF

RE6A041ADAF RE6A041DDAF RE6A070ADAF RE6A070DDAF RE6A084ADAF RE6A084DDAF
RE6A104ADAF RE6A104DDAF RE6A128ADAF RE6A128DDAF RE6A141ADAF RE6A141DDAF
RE6A169ADAF RE6A169DDAF RE6A204ADAF RE6A204DDAF RE6A258ADAF RE6A258DDAF
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RE6E037DDAF RE6E045DDAF RE6E075DDAF RE6E089DDAF RE6E108DDAF RE6E125DDAF
RE6E137DDAF RE6E182DDAF RE6E221DDAF RE6E278DDAF RE4E037DDAF RE4E075DDAF
RE4E107DDAF RE4E149DDAF RE4E186DDAF RE4E234DDAF

RH6A031DDAF RH6A031FDAF RH6A043DDAF RH6A043FDAF RH6A052DDAF RH6A052FDAF
RH6A063DDAF RH6A063FDAF RH6A087DDAF RH6A087FDAF RH6A105DDAF RH6A105FDAF
RH6A132DDAF RH6A132FDAF RH6A156DDAF RH6A156FDAF RH6A175DDAF RH6A175FDAF
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RH6E044DDAF RH6E044EDAF RN6E044FDAF RH6E044GDAF RH6E053DDAF RH6E053EDAF
RH6E053FDAF RH6E053GDAF RH6E066DDAF RH6E066EDAF RH6E066FDAF RH6E066GDAF
RH6E089DDAF RH6E089EDAF RH6E089FDAF RH6E089GDAF RH6E109DDAF RH6E109EDAF
RH6E109FDAF RH6E109GDAF RH6E134DDAF RH6E134EDAF RH6E134FDAF RH6E134GDAF
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RH6E199FDAF RH6E199GDAF RH4E035DDAF RH4E035EDAF RH4E035FDAF RH4E035GDAF
RH4E044DDAF RH4E044EDAF RH4E044FDAF RH4E044GDAF RH4E071DDAF RH4E071EDAF
RH4E071FDAF RH4E071GDAF RH4E087DDAF RH4E087EDAF RH4E087FDAF RH4E087GDAF
RH4E107DDAF RH4E107EDAF RH4E107FDAF RH4E107GDAF RH4E131DDAF RH4E131EDAF

Specific Requirement sought to be waived — Petitioning for a waiver and interim waiver to exempt CO2 Direct Expansion Unit Coolers in Medium and Low Temperature application from being tested to the current test procedure. The prescribed test procedure is not appropriate for these products for the reasons stated previously (liquid inlet saturation temperature and liquid inlet subcooling temperature test condition values are not appropriate for a transcritical CO2 booster system application).

List of manufacturers of all other basic models marketing in the United States and known to the petitioner to incorporate similar design characteristics —

Manufacturer: Heatcraft Refrigeration Products
Manufacturer: Keeprite Refrigeration
Manufacturer: Hussmann/Krack Refrigeration

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Proposed alternate test procedure

1. Utilize the test procedure as outlined in Appendix C to Subpart R of Part 431— Uniform Test Method for the Measurement of Net Capacity and AWEF of Walk-in Cooler and Walk-in Freezer Refrigeration Systems with the exception of modifying the test conditions in Table 15 and 16 for liquid inlet saturation temperature and liquid inlet subcooling temperature as noted below. In addition, per Appendix C to Subpart R of 431 use the calculations in AHRI 1250 section 7.9 to determine AWEF and net capacity for unit coolers matched to parallel rack systems. Use AHRI 1250 Table 17, EER for Remote Commercial Refrigerated Display Merchandisers and Storage Cabinets to determine the power consumption of the system.

Table 15—Refrigerator Unit Cooler

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	35	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.

Refrigeration Capacity Suction A	35	<50	25	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.

Table 16—Freezer Unit Cooler

Test description	Unit cooler air entering dry-bulb, °F	Unit cooler air entering relative humidity, %	Saturated suction temp, °F	Liquid inlet saturation temp, °F	Liquid inlet subcooling temp, °F	Compressor capacity	Test objective
Off Cycle Fan Power	−10	<50	—	—	—	Compressor Off	Measure fan input power during compressor off cycle.
Refrigeration Capacity Suction A	−10	<50	−20	38	5	Compressor On	Determine Net Refrigeration Capacity of Unit Cooler.
Defrost	−10	Various	—	—	—	Compressor Off	Test according to Appendix C Section C11.

Success of the application for Waiver and interim Waiver will: ensure that manufacturers of CO2 Direct Expansion Unit Coolers in Medium and Low Temperature application can continue to participate in the market

What economic hardship and/or competitive disadvantage is likely to result absent a favorable determination on the Application for Waiver and Interim Waiver — Economic hardship will be loss of sales due to not meeting the DOE requirements set forth.

Conclusion:

Heat Transfer Products Group respectfully requests that DOE grant this petition for a Waiver and Interim

Waiver from DOE's current requirement to test CO2 direct expansion unit coolers.

/s/

Michael Straub

Director, Engineering and Product Development

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